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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/771,876	01/29/2001	Chunshan Song	38,058	9020

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EXAMINER

ILDEBRANDO, CHRISTINA A

ART UNIT	PAPER NUMBER
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1725

DATE MAILED: 07/09/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/771,876	Applicant(s) SONG ET AL.	
	Examiner Christina Ildebrando	Art Unit 1725	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 May 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8,10,11,13-19,21-23,25,26 and 28-46 is/are pending in the application.
- 4a) Of the above claim(s) 28-38 and 41 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 45 and 46 is/are allowed.
- 6) ☒ Claim(s) 1-8,10,11,13-19,21-23,25,26,39,40,42 and 43 is/are rejected.
- 7) ☒ Claim(s) 44 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
 If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some * c) ☐ None of:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
 * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
 a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1-21 and 39-40 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

3. Claim 1 recites the limitation "wherein the ratio of additional metal(s) is between 1:10 and 2.5:1." This limitation renders the claim indefinite because it is not clear which metals are in the ratio. It is believed that applicant intends to recite "wherein the ratio of the additional metal(s) to Al" as was recited in original claim 1.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-8, 10, 21-22, and 42 are rejected under 35 U.S.C. 102(b) as being anticipated by Iwamoto et al.

Iwamoto et al. (US 5,207,893) discloses a catalyst composition useful in hydrocracking processes. The catalyst composition comprises an 10-90% of an iron-containing crystalline aluminosilicate and 90-10% by weight of an inorganic binder

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(column 2, lines 50-55). Iwamoto et al. teaches that iron is contained in the zeolite in two forms: as deposited iron (referred to as inactive iron) and iron contained within the framework of the zeolite (column 3, lines 5-25). It is taught that the inactive iron content is not more than 35%, preferably not more than 35% by weight (column 3, lines 30-40). Suitable iron containing aluminosilicates include zeolite Y (column 4, lines 15-20). Suitable binders include boehmite gel and silica (column 6, lines 1-8). Iron containing aluminosilicates having an Fe/Al of 0.69, 0.89, 0.91, 0.84, and 0.82 are exemplified (columns 9-10, Table 1). Iwamoto et al. teaches that the iron containing aluminosilicate is prepared by contacting a zeolite such as zeolite Y with an iron salt in the presence of a mineral acid to incorporate the iron into the zeolite framework (column 2, lines 40-45 and column 5, lines 1-50). With reference to the examples, note that the initial silica to alumina ratio increases following the treatment with the mineral acid and iron salt, which means that iron is substituted for alumina which has been removed from the framework.

As each and every element of the claimed invention is taught in the prior art as recited above, the claims are anticipated by Iwamoto et al.

6. Claims 1, 3, 5-6, 10-11, 14, 16-18, and 21 are rejected under 35 U.S.C. 102(b) as being anticipated by Suzuki et al.

Suzuki et al. (US 4,994,254) discloses a crystalline aluminogallasilicate useful in the preparation of a high octane gasoline. It is taught that the aluminogallasilicates preferably have an $\text{Al}_2\text{O}_3/\text{Ga}_2\text{O}_3$ ratio in the range of 2-4, which yields a Ga/Al of 0.25-0.5 (column 5, lines 5-10). Most preferable silicates are of the MFI type (column 5, lines 10-15). It is taught that the aluminogallasilicates may be formed into various shapes

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using alumina or silica binders (column 5, lines 45-55). Example 2 details the formation of a catalyst composite containing 27% alumina binder (column 10). The composition may further include an active metal such as palladium or platinum in an amount in the range of 0.1-10% by weight (column 6, lines 15-25).

The process limitation in claim 5 is noted, i.e. isomorphic substitution of the metal for Al. However, when the examiner has found a substantially similar product as in the applied prior art, the burden of proof is shifted to applicant to establish that their product is patentably distinct and not the examiner to show the same process of making. *In re Brown*, 173 USPQ 685 and *In re Fessmann*, 180 USPQ 324. In this case, the reference teaches an aluminosilicate composition which incorporated gallium into the zeolite framework, which is the same product as instantly claimed, despite the different method of production.

As each and every element of the claimed invention is taught in the prior art as recited above, the claims are anticipated by Suzuki et al.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 1-8, 10-11, 13-14, 16-19, 21-23, 25-26, 39, and 43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Skeels et al. in view of Farnos et al. or Absil et al.

Skeels et al. (US 5,098,687) discloses zeolite compositions which are topologically related to prior known zeolites but which are characterized as containing framework atoms of iron and/or titanium (column 1, lines 15-25). It is taught that the composition have a formula $(\Sigma_w\text{Al}_x\text{Si}_y)\text{O}_2$, wherein " Σ " represents at least one titanium and/or iron and w, x, and y represent the mole fractions of Σ , Al, and Si, respectively, present as tetrahedral oxides, said mole fractions being such that they are within the trigonal compositional area defined by points A, B, and C:

Point	w	x	y
A	0.49	0.01	0.50
B	0.01	0.49	0.50
C	0.01	0.01	0.98

Refer also to Figure 1. This corresponds to a Σ/Al ratio of 0.02-49, which meets the ranges instantly claimed.

Skeels et al. teaches that a crystalline zeolite is contacted with an effective amount of a fluoro salt of titanium and/or iron whereby framework aluminum atoms of the zeolite are removed and replaced by titanium and/or iron atoms (column 5, lines 20-35). Suitable zeolites include zeolite Y, mordenite, zeolite L, zeolite, beta zeolite, and ZSM-5 (column 6, lines 1-15 and column 8, lines 30-50). Note also the examples which detail the preparation of iron-substituted zeolite Y, iron-substituted mordenite, iron-substituted zeolite L, and titanium-substituted ZSM-5, which have Fe/Al and Ti/Al ratios falling within the ranges instantly claimed. Skeels et al. teaches a washing post-

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treatment to reduce the amount of salts in the zeolites (column 6, lines 35-55), which is considered to meet the deactivation step instantly claimed.

Skeels et al. teaches that the iron and/or titanium substituted zeolite compositions may be used as catalysts in various hydrocarbon conversion processes and may be combined with other known catalytic materials (column 45, lines 25-35). Specifically Skeels et al. teaches that substituted zeolites may be combined with Group VIII noble metals in amounts between about 3 and about 15 weight percent (column 48, lines 1-10).

Skeels et al. does not teach the use of a binder in combination with the metal substituted zeolite.

Farnos et al. (US 5,614,079) teaches that zeolite catalysts are often incorporated with a matrix or binder materials to impart strength during hydrocarbon conversion processes and that the most commonly used binder materials include alumina, clay, and silica (column 2, lines 60-69).

Absil et al. (US 4,837,397) teaches that, in order to improve the physical strength of catalysts, the zeolite is formulated with a matrix or binder in order to improve its crushing strength and attrition resistance (column 5, lines 20-25). Suitable binders include alumina, silica, and magnesia, which is employed in amounts in the range of about 5 to about 80 percent (column 5, lines 25-65).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the composition taught by Skeels et al. in light of the teaching by either Farnos et al. or Absil et al. that zeolite catalysts are conventional

combined with binders in order to impart strength and improve the attrition resistance of the composition.

Regarding claims 19 and 43, the modified disclosure of Skeels et al. does not specifically teach an iron-substituted ZSM-5. However, Skeels et al. suggests that either iron and/or titanium may be substituted into a zeolite such as ZSM-5 and further exemplifies a titanium substituted ZSM-5.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to substitute iron in place of titanium in the ZSM-5 composition taught by Skeels et al. in light of the teaching by Skeels et al. that either titanium or iron may be used, suggesting that the use of iron is functionally equivalent to titanium.

Allowable Subject Matter

9. Claims 45-46 are allowed. Reasons for Allowance were provided in Paper No. 13.

10. Claims 15 and 40 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

11. Claim 44 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

12. Applicant's arguments filed May 23, 2003 have been fully considered but they are not persuasive.

With regards to the rejection under 35 USC 102(b) over the Iwamoto et al. reference, applicant argues that the reference does not disclose the binder required by claim 1. However, the reference teaches the use of an inorganic oxide in combination with the zeolite in an amount in the range of 10-90% by weight which meets the range 5-95% recited in the instant claims.

Next, applicant argues that Iwamoto et al. does not meet the limitation "under conditions effective for substituting aluminum in the aluminosilicate zeolitic material with metal." However, Iwamoto et al. teaches that the aluminum is substituted by iron. As no specific conditions are required by claim 22, it is the position of the examiner, that the reference would meet the limitation "under conditions effective." Applicant argues that the references does not teach the specific metal fluoride compounds disclosed in the specification. However, this argument is not commensurate in scope with what has been claimed. Claim 22 does not require any particular metal compound. Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Finally, applicant argues that the examiner's statement that the initial silica to alumina ratio increases following the treatment with the mineral acid and iron salt, which means that iron is substituted for alumina which has been removed from the framework,

is contrary to the examples because of the weight percentages of salt used. However, it appears that applicant has misinterpreted the examples. The examples detail the preparation of an iron substituted aluminosilicate prepared from a zeolite having an initial $\text{SiO}_2/\text{Al}_2\text{O}_3$ of 5, using various concentrations of mineral acid, to yield $\text{SiO}_2/\text{Al}_2\text{O}_3$ of 22.3, 25.3, 18.2, etc. The data indicates that the alumina has decreased and been replaced by iron.

With regards to the rejection under 35 USC 102(b) under the Suzuki et al. reference, applicant argues that the Ga/Al ratio detailed in Table 17 detail a range of 0.036 to 2.78, while claim 1 requires a range of 0.1-2.5. However, the examiner submits that the claimed range meets this range. Also, the reference teaches specifically that the ratio of $\text{Al}_2\text{O}_3/\text{Ga}_2\text{O}_3$ is preferably 2-4, which yields a $\text{Ga}_2\text{O}_3/\text{Al}_2\text{O}_3$ (by taking the inverse) of 0.25-0.5 and a Ga/Al of 0.25-0.5, which meets the range claimed. Next, applicant argues that the reference does not teach the amount of binder which may be employed. However, the reference teaches the preparation of a catalyst composite containing 27% by weight of an alumina binder (column 10) which meets the range instantly claimed. Finally, applicant argues that the reference does not teach a noble metal in the amount of 0.05 to 2% by weight. However, the reference teaches a noble metal in the range of 0.1-10% by weight, which meets the ranges instantly claimed.

With regards to the various rejections over the Skeels et al. reference, applicant argues that Skeels et al. does not teach metals such as Ga, Co, or mixtures of Fe, Ga, Ti, and Co. However, the reference teaches the use of iron and titanium substituted zeolites and therefore meets the claims. Applicant further argues that Skeels et al. does

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not teach the use of a binder. However, this was acknowledged by the examiner.

Applicant did not present any evidence or arguments rebutting the prima facie case of obviousness set forth by the examiner regarding the use of a binder. Applicant argues that Skeels et al. does not teach a refluxing steps. However, the examples detail the preparation using a refluxing step. Finally, applicant argues that it would not have been obvious to substitute iron in place of titanium. However, applicant presents no arguments or evidence to rebut the prima facie case of obviousness set forth by the examiner.

Conclusion

13. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

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14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christina Ildebrando whose telephone number is (703) 305-0469. The examiner can normally be reached on Monday-Friday, 7:30-5, with Alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Dunn can be reached on (703) 308-3318. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0651.

CAI
June 30, 2003


M. ALEXANDRA ELVE
PRIMARY EXAMINER